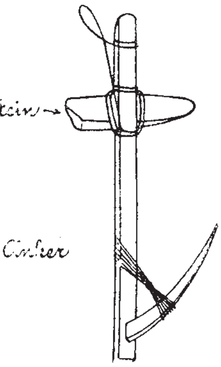
Lastly, there is an admirable account (eighty pages) of Malayo-Polynesian shipping, especially as occurring in German areas; this is particularly valuable on account of the diagrams (136 in number) of the different parts and appliances, also for the native names of these. It is interesting to note a certain similarity between a form of stone anchor from the west of Ireland and that represented in Fig. 36*a*, p. 242, here reproduced.



Enough has been said to show that this work contains much information of interest, all of which is obtainable for the modest sum of 3.60 marks. There are a few plates, and a map of New Ireland, Gazelle Peninsula, and New Hannover coloured to show the distribution of languages. We shall look forward to further investigations by Dr. Friederici, whose wide acquaintance with ethnological literature particularly fits him for comparative work.

A. C. H.

## SOLAR RADIATION AT DAVOS.

IN *Naturwissenschaftliche Wochenschrift* (No. 4, 1912), Dr. F. M. Exner gives an elaborate analysis of the principal results of Dr. C. Dorno's painstaking measurements of solar radiation and atmospheric electricity at Davos in 1908–10, made with the most up-to-date instruments, and published, with numerous tables and plates, in a stately quarto volume, entitled "Studie über Licht und Luft im Hochgebirge" (F. Vieweg and Son, Brunswick). We can only quote here two or three of the actinometric results, which serve to show the nature of the work. Although Dr. Exner's analysis is so full, the work contains so much material that it is impossible even to make mention of all the results. The following are the results of 662 determinations:—

*Dependence of the Intensity of Radiation on the Sun's Altitude in the Mean of the Year, expressed in Gram Calories (per sq. cm. per min.).*

| 10° | 15° | 20° | 25° | 30° | 35° | 40° | 45° | 50° | 55° | 60° | 65° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1·047 | 1·131 | 1·172 | 1·226 | 1·274 | 1·302 | 1·329 | 1·342 | 1·355 | 1·359 | 1·369 | 1·364 |

The daily range of intensity is given for each season and for the year. For the latter we find:—

| 6h. a. | 7h. a. | 8h. a. | 9h. a. | 10h. a. | 11h. a. | Noon | 1h. p. |
|---|---|---|---|---|---|---|---|
| 1·106 | 1·141 | 1·217 | 1·315 | 1·324 | 1·372 | 1·384 | 1·360 |

| 2h. p | 3h. p. | 4h. p. | 5h. p. | 6h. p. |
|---|---|---|---|---|
| 1·311 | 1·258 | 1·206 | 1·094 | 1·018 (June–August) |

With the aid of a Campbell-Stokes sunshine recorder the following effective monthly values of radiation in kilogram calories on a horizontal surface were calculated:—

*Monthly Values and Percentage of Possible Values.*

| Dec. | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1·9 | 2·3 | 3·3 | 6·0 | 7.2 | 9.6 | 10.[illegible] | 10·8 | 11·0 | 7·8 | 5·1 | 2·8 | 78·1 |
| 53·5 | 55·7 | 51·6 | 56·2 | 46·5 | 49·9 | 51·7 | 56·0 | 63·6 | 60·9 | 60·0 | 59·4 | 55·0 |

Davos owes its high radiation to its height above sea-level (1560 m.), the southerly aspect of the valley, and its small amount of cloud in the winter months. The highest value of solar radiation measured was 1·522 gram calories (March 5).

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—On March 26 last the City Council passed a resolution, "That, having received a grant from the city rates, the University of Birmingham be asked to consider the advisability of granting degrees to external students, particularly those trained in the municipal technical schools or the Birmingham and Midland Institute, and report thereon to the council." In reply to this request the council and Senate of the University have just issued a statement setting forth the result of their deliberations on the subject. They point out that "the University was intended by its founders to be limited in granting degrees to students attending the University or affiliated institutions. Courses of instruction under recognised teachers, and daily association with fellow-undergraduates, give a meaning and a value to a degree which would be entirely lost if the degree were granted to external students." The council also points out that the external side of London University already meets the needs of the external student, and that it is quite unnecessary to set up two universities having this external character in the British Isles.

CAMBRIDGE.—The General Board of Studies has reappointed Dr. Barclay-Smith as University lecturer in human anatomy.

The Raymond Horton-Smith prize for 1912 has been awarded to Dr. V. J. Woolley, for a thesis for the degree of Doctor of Medicine—subject, "The time-relations of the actions of entero-kinase and of trypsin under various conditions"; *proximè accessit,* Dr. A. E. Barclay, for a thesis for the same degree—subject, "The diagnosis of gastric and œsophageal affections by X-ray methods." The M.D. Degree Committee places on record its appreciation of the high standard attained by most of the theses submitted for the degree of Doctor of Medicine. Many of these theses, either records of clinical investigations on obscure diseases or original laboratory research, ought in the opinion of the committee to be published. The theses submitted by G. G. Butler—subject, "The fragility of the red blood corpuscle; A. J. Clark—subject, "The mode of excretion of hæmoglobin and its derivatives; Dr. F. P. Franklen-Evans—subject, "The sensory nerve endings in joints—are worthy of special distinction.

The Special Board for Biology and Geology has nominated, to use the University table at Naples, G. R. Mines, H. M. Fuchs; and J. Gray, to occupy the University table at the laboratory of the Marine Biological Association at Plymouth.

OXFORD.—It is proposed to hold an election in Michaelmas term next to an ordinary fellowship in Magdalen College, after an examination having special reference to excellence in medical science (physiology and pathology).

Convocation on June 25 confirmed the decree accepting the grant of 900*l.* from the Board of Agriculture and Fisheries in aid of investigations into the economics of agriculture. On the same day it passed a decree accepting the sum of 10,000*l.* for the promotion of the study of agriculture from Mr. Walter Morrison, M.A., of Balliol College. It is proposed to apply 3000*l.* of Mr. Morrison's benefaction towards the extension of the Rural Economy Laboratory, it being understood that the Board of Agriculture and Fisheries is prepared to make a grant of an equal amount towards the same object, and to invest the remaining 7000*l.*, using the income for the mainten-of the laboratory and for other purposes connected with the study of agriculture in the University. This makes the third donation of 10,000*l.* given to the University by the same benefactor during the present month; the other two being for a professorial pension fund and the study of Egyptology respectively.

Dr. Louis A. Bauer, director of the Department of Research in Terrestrial Magnetism at the Carnegie Institution of Washington, has been appointed Halley lecturer for the year 1913.

The annual report of the delegates of the University Museum has just been published. It records the conversion of the southern portion of the old Radcliffe Library into two rooms by the insertion of a fireproof floor. The room has great historic interest as being the scene of the famous encounter between the late Prof. Huxley and Bishop Wilberforce, of Oxford, during the meeting of the British Association in 1860. The lower portion is now occupied by the Hope professor of zoology, and the upper division is used as a pharmacological laboratory. The report of the Linacre professor makes special mention of valuable specimens from Madagascar, including many remains of fossil Lemuroids, collected by the Hon. P. A. Methuen. The Hope professor announces several important donations from equatorial Africa. A long list of accessions to the Pitt-Rivers Museum is contributed by the curator, and many donations to their respective departments are enumerated by the professors of geology and mineralogy. In all the departments a good account is given of lectures and other instruction carried on during the past year, and a statement of the original work done in connection with the various laboratories and collections, together with the publications by members of the staff and others, is also included. The whole forms a record of much valuable work, and gives evidence of great activity in the scientific departments of the University.

The Electors to the Waynflete professorship of chemistry give notice that they intend to proceed to an election in October next.

LIVERPOOL.—Dr. E. E. Glynn has been appointed to the George Holt professorship of pathology in succession to the late Sir Rubert Boyce.

MR. J. DAVIDSON has been appointed by the governors of the Imperial College of Science and Technology to the studentship in entomology founded by Sir John Wolfe-Barry, K.C.B., F.R.S., to foster research work in entomology from the economic point of view.

IN commemoration of the visit of the King and Queen to the King Edward VII. Hospital, Cardiff, on Friday next, an anonymous donor has forwarded a gift of 10,000 guineas for the building of the new pathological wing of the institution which is to be erected for the Welsh Medical School, the joint establishment of the Hospital and University College of South Wales and Monmouthshire.

OWING to the resignation of Mr. G. Udny Yule on his appointment as university lecturer in statistics at Cambridge, we understand that there is a vacancy for an assistant in the department of technology of the City and Guilds of London Institute, at a commencing salary of 300*l.* per annum. Candidates should possess a university degree, preferably in engineering. Particulars of the appointment can be obtained on application to the Superintendent of the Department of Technology, Exhibition Road, S.W.

NEARLY 200,000*l.* was, says *Science*, distributed in grants by the General Education Board in the United States at its meeting on May 24. 50,000*l.* was given to the George Peabody College for Teachers at Nashville, Tenn., for the establishment of a school of country life. The other colleges awarded conditional grants are:—Beloit College, Beloit, Wis., and Coe College, Cedar Rapids, La., each 20,000*l.*; McAlester College, St. Paul, Minn., 10,000*l.*; University of Rochester, Rochester, N.Y., 40,000*l.* The sum of 42,000*l.* was set aside for demonstration work in agriculture in the southern States, for professors of secondary education in State universities of the south, and to aid the work of negro education in the south.

THE Congress of the Universities of the Empire will be opened at the University of London on Tuesday next, July 2, by Lord Rosebery. The congress will continue until Friday, inclusive; the following subjects will be discussed:—Question of division of work and specialisation among universities; inter-university arrangements for post-graduate and research students, including the questions of reciprocal recognition of courses for post-graduate degrees, co-operation in post-graduate courses and specialisation in post-graduate courses along special lines among universities; the relation of universities to technical and professional education and to education for the Public Services; interchange of university teachers; the problem of universities in the East in regard to their influence on character and moral ideals; residential facilities, including colleges and hostels in connection with universities; conditions of entrance to universities and the possibility of equivalence and mutual recognition of entrance tests to degree courses; action of universities in relation to the after-careers of their students; provision of courses of study and examinations for other than degree students, including university extension and tutorial class work and specialised courses both of a general and technical character for students engaged in professional, commercial, and industrial pursuits; the establishment of a central bureau; the position of women in universities; representation of teachers and graduates on the governing body of a university.

JUDGING from the reports which reach us from time to time, there is an increasing desire in the various parts of the Empire to improve and develop the systems of education in vogue. In addition to attendance at imperial and other conferences, delegates from the various Colonies have been sent to travel in different countries to study and report upon the work of representative schools, colleges, and universities. A report of the kind, subsequently distributed for the use of Colonial educational workers, is that by Mr. Cecil Andrews, the inspector-general of schools in Western Australia, recently issued by the authority of the Education Department at Perth. In this case Mr. Andrews gives his chief attention to high schools and discusses their organisation and their relations to lower schools on one hand and to colleges on the other. The opportunities the writer has had of studying typical educational arrangements have enabled him to make a series of recommendations to the Minister of Education in Western Australia, which should prove of real assistance. He suggests that the course of study in the State schools should be uniform for all children until the sixth standard is reached at thirteen or fourteen years of age. The boy or girl may then proceed, he thinks, to a high school, remain in higher classes of the primary school, or proceed to a "farm" school or to a day industrial school. Similarly, full particulars are given of the higher education which it is urged should be developed as opportunity arises.

To the issues of *Science* for May 24 and 31 last, Prof. J. McKeen Cattell, of Columbia University, contributes articles entitled "University Control." A great variety of questions concerning general university administration are dealt with in an original and helpful way. Prof. Cattell has very definite views as to the inadequate character of the remuneration received by the great majority of men of science. Professors and investigators should have, he maintains, adequate incomes, as large as is desirable for any social class, but above all they should have opportunity to lead a life free from distracting or dishonourable compromises. If the maximum income of a university professor or man of science with a family should be from 1000*l*. to 2000*l*., no one, says Prof. Cattell, should receive more, except to cover greater risks. There is no occupation requiring rarer ability or more prolonged preliminary training, and there is none the services of which to society are greater. If there are to be money prizes—incomes of 4000*l*. or 20,000*l*. or more—then they should be open to professors and investigators. Scientific ability is as rare as executive or legal ability, and is far more valuable to society. The lawyer who receives a fee of 160,000*l*. for enabling a group of promoters to get ten times as much by evading the intent of the law does not add to the wealth of society. The man of science who increases the yield of the cereal crop by 1 per cent. adds 2,000,000*l*. a year to the wealth of the country and five times as much to the wealth of the world. The man of science who discovered and those who have developed the Bessemer process of making steel have, according to the estimate of Abram S. Hewitt, added 400,000,000*l*. yearly to the world's wealth. There is no reason, he urges, except the imperfect adjustments of society why the lawyer should receive large rewards and the man of science a scant salary.

## *SOCIETIES AND ACADEMIES.*

### London.

**Royal Society,** June 20.—Sir Archibald Geikie K.C.B., president, in the chair.—Dr. D. **Ellis**: An investigation into the life-history of *Cladothrix dichotoma* (Cohn).—Leonard **Hill** and Martin **Flack**: The relation between secretory and capillary pressure. I., the salivary secretion. The authors find that when the salivary secretion from the submaxillary gland is obstructed, and the salivary pressure during stimulation of the chorda tympani nerve rises above the arterial pressure, the outflow of venous blood from the gland continues. Under these conditions the gland feels very tense; by squeezing it the secretory pressure, which in some cases is nearly twice as high as the arterial pressure (*e.g.* 240 mm. Hg compared with 130 mm. Hg), is still further raised, while the flow of blood from the vein is stopped.—G. W. **Ellis** and J. A. **Gardner**: The origin and destiny of cholesterol in the animal organism. Part IX., on the cholesterol content of the tissues (other than liver) of rabbits under various diets and during inanition.—C. H. **Martin**: A note on the protozoa from sick soils, with some account of the life-cycle of a monad flagellate. On Russel and Hutchison's hypothesis that soil sickness is due to ingestion of soil bacteria by protozoa, these should be found in sick soils, capable of either leading a trophic life with the fairly low percentage of water found in dry soils (viz. 20 per cent. by volume), or else with a capacity of readily encysting and of reproducing with enormous rapidity as soon as the soil becomes saturated with the necessary amount of moisture. To throw some light on this question, cultures were made on agar plates from three different sick soils. It was noticed that each small sample of each soil for each culture condition gave rise to a fairly constant specific fauna, whereas samples of the other soils under these conditions have also given rise to constant, but quite distinct, faunas.—E. W. Ainley **Walker**: Further observations on the variability of Streptococci in relation to certain fermentation tests, together with some considerations bearing on its possible meaning. Observations have been continued on the variability of Streptococci in relation to Gordon's tests. These tests consist, in the main, in growing the micro-organisms concerned in the presence of particular carbohydrates and noting whether an acid reaction is or is not produced in the culture medium within a given period of time. It is believed by M. H. Gordon, who introduced the tests, that their application reveals the existence of distinct varieties among the micro-organisms grouped together under the term streptococcus. In previous communications evidence was presented to prove that this is not the case. Additional evidence is now brought forward supporting the same contention and leading to the conclusion that there is at present no proof of the existence of more than one kind of streptococcus pathogenetic for man.—Dr. A. **Harden** and W. J. **Penfold**: The chemical action on glucose of a variety of *Bacillus coli communis* (Escherich) obtained by cultivation in presence of a chloroacetate (preliminary notice). The organism in question produces no gas when grown on glucose peptone water, aërobically, in a test-tube provided with a Durham gas tube; but when grown anaërobically in presence of chalk it yields an amount of hydrogen and carbon dioxide which is approximately 0·25–0·3 of that given by the normal organism. The amounts of alcohol and acetic acid are similarly diminished and that of lactic acid increased. The organism retains the power of decomposing formates.—V. J. **Harding**: The action of enzymes on hexosephosphate.—Prof. F. **Keeble** and Dr. E. F. **Armstrong**: The oxydases of *Cytisus Adami*. The investigation was undertaken with a twofold object:—(1) To test Baur's hypothesis that this graft-hybrid is a peridinal chimera composed of an epidermis derived from *Cytisus purpureus* and a body derived from *C. laburnum*; (2) to ascertain whether migration of oxydases may occur in plants. The results confirm Baur's conclusions, and indicate that oxydases may pass from one tissue to another.

**Geological Society,** June 5.—Prof. W. W. Watts, vice-president, in the chair.—Prof. W. Boyd **Dawkins**: The further evidence of borings as to the range of the south-eastern coalfield and of the Palæozoic floor, and as to the thickness of the overlying strata. Two experimental borings carried out under the author's direction in 1910–11 led to unexpected results. Hitherto the Coal Measures were either horizontal, or dipping in the normal fashion without signs of faulting, and there was every reason to believe that the Coal-Measure trough would be struck, on the first site, at Chilham, about three miles south-west of Canterbury. Instead, however, of Coal Measures, Upper Silurian shales with *Monograptus priodon* formed the Palæozoic floor at 1072 ft. below O.D. In the second at Bobbing, near Sittingbourne, hard Silurian grits and shales occurred at 1070 ft. below O.D. In both borings the Silurian rocks are nearly vertical, and bear marks of crushing.—J. W. **Stather**: Shelly clay dredged from the Dogger Bank. The Dogger Bank fishermen frequently get in their nets a tough peaty material, which they call "moorlog." In looking over some recently dredged "moorlog" brought in by a Hull trawler, the author noticed that, adhering to the specimens of "moorlog," was a dark silty clay, full of marine shells. These specimens of "moorlog," with the associated shelly clay, were dredged in lat. 55° 24′ N., and long. 3° 10′ E., at a depth of twenty fathoms. A collection of these shells was submitted to Mr. Clement Reid, who stated that they are all assignable to very shallow-water species, and probably flourished just